Stony Brook University

PHENIX

Improving the Central Tracking Software in sPHENIX

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One step back…

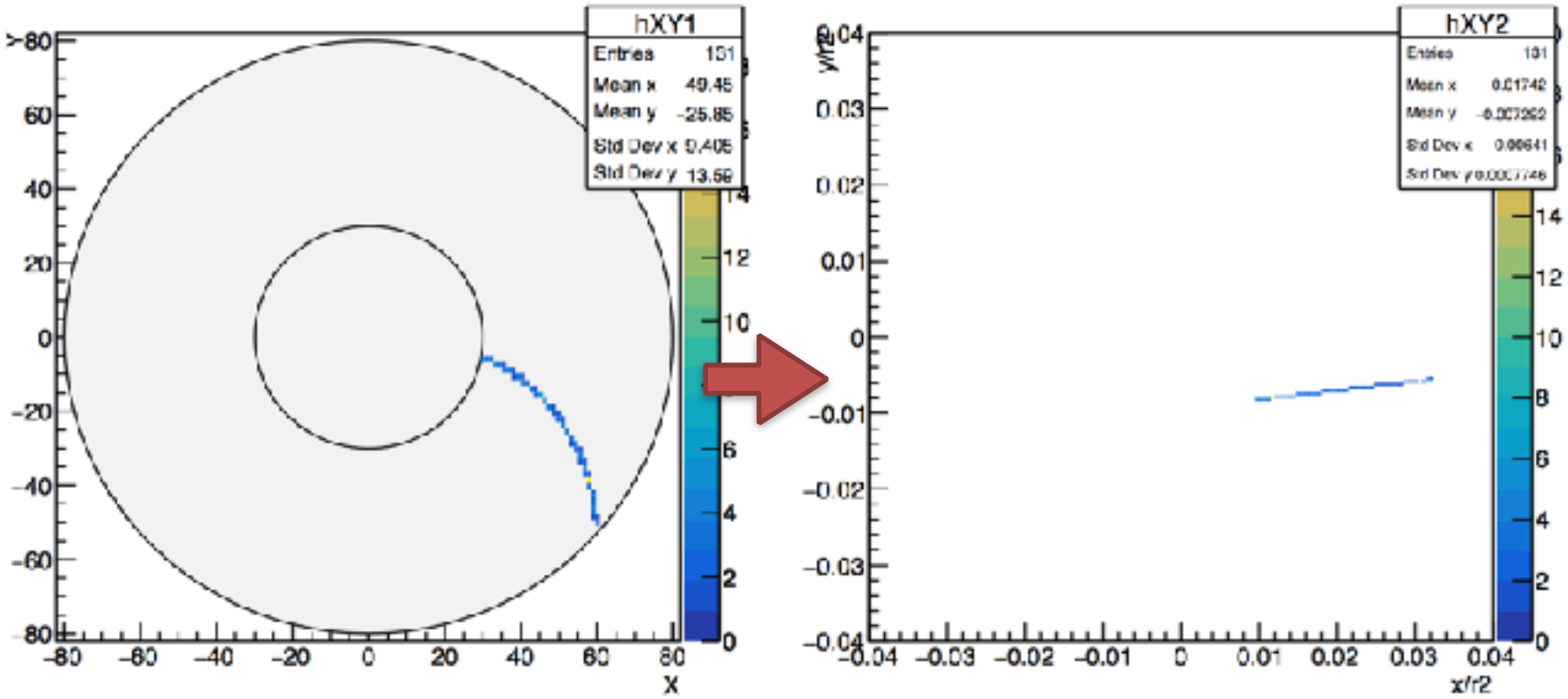
- Need a workbench where we can test all these improvements in a self consistent and self controlled framework.

- Extracted parts of the sPHENIX simulation package that isolate the TPC particulars.
- Test in standalone mode (using local Geant4+Tools).

- We believe that these tests will provide powerful feedback and will allow to test the fundamental understanding of the TPC simulation including its physics from first principles.

Conformal Map

- Linearisation of curved pattern in X-Y is achieved by the following transformation:
  - x’ = (x-A)/r^2 y’=(y-B)/r^2 r=(x-A)^2 + (x-B)^2



Testing alternative pattern recognition strategy

OLYMPUS

Why Olympus?

- Olympus contains two very efficient algorithms:
  - Store a collection of patterns of up to 128bits each on disc.
  - Evaluate if a given pattern contains one from the collection.
- We adapt these features as much as possible to attack our current pattern recognition challenge.

Olympus for Central Tracking

- Clusters can be group into “macroscopic cells” in order to reduce the bit-train size.
- However this reduction might compromise efficiency for high multiplicity events.

- Is it possible to exploit symmetry created by central membrane?
- Is it feasible to catalog in eta?
- Which is better: to add vertex to catalog or to displace patterns during matching?
- Is it better to do matching after space transformation?

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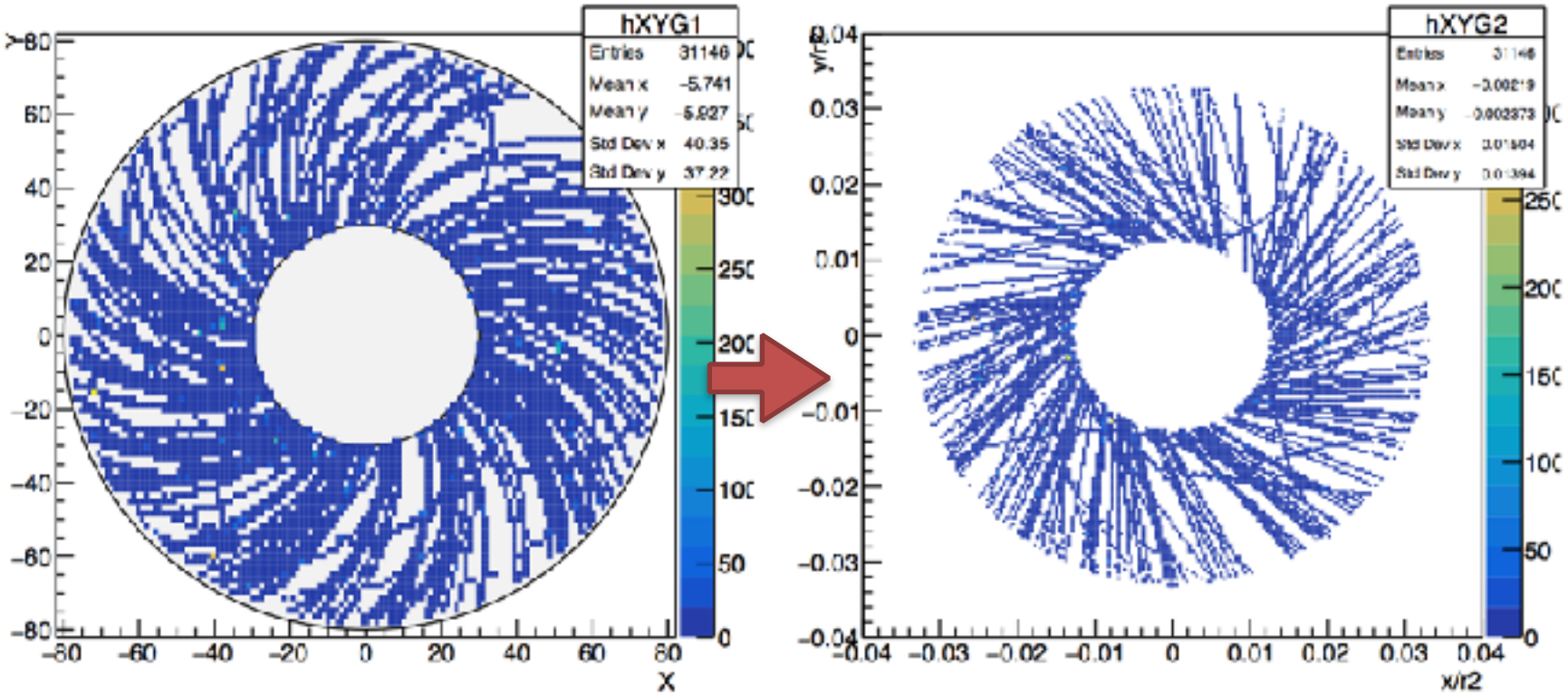

Each track is from a randomly oriented pion of fixed energy and fix origin.